

CLAIMS:

1. A photo-curable transfer sheet having a photo-curable transfer layer comprising a photo-curable composition, the photo-curable composition being deformable by application of pressure and containing a reactive polymer having a photopolymerizable functional group,

wherein the photo-curable transfer layer shows linearity in relationship between strain $[\gamma]$ (%) and time $[t]$ (second) determined by a creep test using a dynamic viscoelasticity measuring apparatus under the conditions of an ordinary temperature, stress of 50Pa and a time period of 120 seconds, and satisfies a following formula:

$$\log \gamma = a + b \cdot \log t$$

in which "a" is a real number, and "b" is in the range of 0.10 to 0.53.

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2. The photo-curable transfer sheet as defined in claim 1, wherein the reactive polymer has a glass transition temperature of not more than 20°C.

3. The photo-curable transfer sheet as defined in claim 1 or 2, wherein the reactive polymer has number average molecular weight of 10,000 to 300,000.

4. The photo-curable transfer sheet as defined in any of claims 1 to 3, wherein the reactive polymer has weight average molecular weight of 10,000 to 300,000.

5. The photo-curable transfer sheet as defined in any of claims 1 to 4, wherein the reactive polymer has 1 to 50% by mole of the photopolymerizable functional group.

5 6. The photo-curable transfer sheet as defined in any of claims 1 to 5, wherein the photopolymerizable functional group is a (meth)acryloyl group.

7. The photo-curable transfer sheet as defined in any of claims 1 to 6,
10 wherein the reactive polymer has a functional group having active hydrogen and the photopolymerizable functional group, and the photo-curable composition contains a compound having at least two groups reactive to the functional group having active hydrogen.

15 8. The photo-curable transfer sheet as defined in claim 7, wherein the functional group having active hydrogen is a hydroxyl group.

9. The photo-curable transfer sheet as defined in claim 7 or 8, wherein
20 the groups reactive to the functional group having active hydrogen are isocyanate groups.

10. The photo-curable transfer sheet as defined in any of claims 1 to 9, wherein the photo-curable composition further contains a tackifier having solubility parameter (SP value) of not less than 8.50.

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11. The photo-curable transfer sheet as defined in any of claims 1 to 10,

wherein the photo-curable composition further contains a transparent fine particle having mean particle size of not more than 300nm.

12. The photo-curable transfer sheet as defined in any of claims 1 to 11,
5 wherein the photo-curable transfer layer has storage elastic moduli of 1×10^3 to 9×10^4 Pa at frequency of 1Hz and a temperature of 25°C, of not less than 5×10^3 Pa at a frequency of 0.01Hz and a temperature of 25°C, and of not more than 1×10^7 Pa at frequency of 100Hz and a temperature of 25°C.

10 13. The photo-curable transfer sheet as defined in any of claims 1 to 12, wherein the photo-curable composition further contains a phenol compound having a substituent or substituents in the amount of 0.01 to 0.3 % by weight.

15 14. The photo-curable transfer sheet as defined in any of claims 1 to 13, wherein a surface of a cured layer formed by curing the photo-curable composition has a water contact angle of not less than 60 degrees.

20 15. The photo-curable transfer sheet as defined in any of claims 1 to 14, wherein the photo-curable composition contains phosphoric acid (meth)acrylate or derivatives thereof in the amount of 10 to 220ppm.

25 16. A photo-curable transfer sheet having a photo-curable transfer layer comprising a photo-curable composition, the photo-curable composition being deformable by application of pressure and containing a reactive

polymer having a photopolymerizable functional group and a functional group having active hydrogen,

5 wherein the photo-curable composition contains a compound having at least two groups reactive to the functional group having active hydrogen.

17. A photo-curable transfer sheet having a photo-curable transfer layer comprising a photo-curable composition, the photo-curable composition being deformable by application of pressure and containing a reactive
10 polymer having a photopolymerizable functional group,

wherein the photo-curable composition further contains a tackifier having solubility parameter (SP value) of not less than 8.50.

18. A photo-curable transfer sheet having a photo-curable transfer layer
15 comprising a photo-curable composition, the photo-curable composition being deformable by application of pressure and containing a reactive polymer having a photopolymerizable functional group and a transparent fine particle having mean particle size of not more than 300nm.

20 19. A photo-curable transfer sheet having a photo-curable transfer layer comprising a photo-curable composition, the photo-curable composition containing a reactive polymer having a photopolymerizable functional group,

wherein the photo-curable transfer layer has storage elastic moduli
25 of 1×10^3 to 9×10^4 Pa at frequency of 1Hz and a temperature of 25°C, of not less than 5×10^3 Pa at a frequency of 0.01Hz and a temperature of 25°C, and

of not more than 1×10^7 Pa at frequency of 100Hz and a temperature of 25°C.

20. A photo-curable transfer sheet having a photo-curable transfer layer
5 comprising a photo-curable composition,

the photo-curable composition containing a reactive polymer having a photopolymerizable functional group, and a phenol compound having a substituent or substituents in the amount of 0.01 to 0.3 % by weight.

- 10 21. A photo-curable transfer sheet having a photo-curable transfer layer containing a reactive polymer having a photopolymerizable functional group,

wherein a surface of a cured layer formed by curing the photo-curable transfer layer has a water contact angle of not less than 60
15 degrees.

22. A photo-curable transfer sheet having a photo-curable transfer layer comprising a photo-curable composition, the photo-curable composition containing a reactive polymer having a photopolymerizable functional
20 group and further containing phosphoric acid (meth)acrylate or derivatives thereof in the amount of 10 to 220ppm.

23. The photo-curable transfer sheet as defined in any of claims 1 to 22, wherein a release sheet is provided on one side or both sides of the
25 photo-curable transfer layer.

24. The photo-curable transfer sheet as defined in claim 23, which is in the form of continuous length, and has the same width as the release sheet.

25. A process for the preparation of an optical information recording
5 medium comprising of the steps (2) to (4):

a step (2) of removing the release sheet on one side of the photo-curable transfer sheet as defined in claim 23 or 24,

a step (3) of placing the photo-curable transfer sheet on an uneven surface of a reflective layer, such that the photo-curable transfer layer is in
10 contact with the uneven surface, the reflective layer being formed on an uneven surface of a substrate having the uneven surface of recorded pits and/or grooves, and depressing the photo-curable transfer sheet and the substrate to form a laminate in which the one side of the photo-curable transfer sheet adheres closely to the uneven surface of the reflective layer,
15 and

a step (4) of removing the release sheet on the other side of the photo-curable transfer layer of the laminate.

26. The process for the preparation of an optical information recording
20 medium as defined in claim 25,

wherein prior to the step (2), the following step (1) is performed:

a step (1) of punching out a disc from the photo-curable transfer sheet, or

a step (1) of punching out a disc comprising the photo-curable
25 transfer layer and the release sheet on one side of the photo-curable transfer sheet from the photo-curable transfer sheet without punching out the other

side release sheet.

27. The process for the preparation of an optical information recording medium as defined in claim 25 or 26,

5 wherein after the step (4), the following steps (5) and (6) are performed:

a step (5) of placing an uneven surface of a stamper having the uneven surface of recorded pits and/or grooves on the surface having no release sheet of the laminate, and depressing the photo-curable transfer sheet
10 and the stamper to form a laminate in which the surface of the photo-curable transfer layer adheres closely to the uneven surface of the stamper, and

a step (6) of exposing the laminate having the stamper to ultraviolet rays to cure the photo-curable transfer layer, and removing the stamper
15 from the laminate to form an uneven surface on the photo-curable transfer layer.

28. The process for the preparation of an optical information recording medium as defined in claim 27,

20 wherein after steps (5) and (6), the following step (7) is performed:

a step (7) of forming a reflective layer on the uneven surface of the photo-curable transfer layer.

29. An optical information recording medium obtainable by the process
25 as defined in any of claims 25 to 28.

30. An optical information recording medium comprising a cured layer of a photo-curable composition having an uneven surface of recorded pits and/or grooves and a reflective layer of a silver or silver alloy formed on the uneven surface,

5 wherein the photo-curable composition is the composition as defined in any of claims 1 to 22.

31. An optical information recording medium comprising an optical information recording substrate having an uneven surface of recorded pits
10 and/or grooves, a reflective layer of a silver, silver alloy or silver compound formed on the uneven surface, and a cured layer of a photo-curable composition in close contact with the uneven surface of the reflective layer,

 wherein the photo-curable composition is the composition as defined in any of claims 1 to 22.